

## CLAIMS

1. An instrument for the analysis of volatile organic compounds including  
a downstream quadrupole mass filter and an upstream quadrupole mass filter  
housed within an evacuated chamber, and

5 a curved flow tube connecting the upstream quadrupole mass filter to the  
downstream quadrupole mass filter.

2. The instrument as claimed in claim 1, including

means associated with the chamber and connectable to an ion source to direct  
10 ions from the source to the upstream quadrupole mass filter to extract ions to create a  
precursor ion beam

a lens to focus the ion beam and to inject the beam into a first end of the curved  
flow tube,

means to enable a stream of non-reactive carrier gas to pass through the flow tube  
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injection means through which the sample of the volatile organic compounds may  
be injected into the flow tube to react with the extracted ions,

means to connect the second end of the flow tube to the downstream quadrupole  
mass filter through which the sample of charged ions are directed to a detector device.  
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3. The instrument as claimed in claim 1, including an electrostatic shield located in the  
chamber to shield the downstream quadrupole mass filter and detector from the upstream  
quadrupole mass filter and source introduction.

25 4. The instrument as claimed in claim 1, wherein the non-reactive carrier gas is  
helium.

5. The instrument as claimed in claim 1, wherein the non-reactive gas comprises a  
mixture of helium and other non-reactive gases.  
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6. The instrument as claimed in claim 1, wherein the flow tube is pressurised at a  
higher pressure than that of the interior of the chamber.

7. The instrument as claimed in claim 1, wherein the flow tube acts as a drift tube and has a potential gradient applied to it.

5 8. The instrument as claimed in claim 1, wherein the flow tube acts as a flow tube and has no potential gradient applied to it.

9. The instrument as claimed in claim 1, wherein a vacuum pump is utilised to ensure the non-reactive carrier gas will pass through the flow tube.

10 10. The instrument as claimed in claim 1, wherein the injection of the non reactive gas into the flow tube is effected through a venturi orifice.

11. The instrument as claimed in claim 10, wherein the curved flow tube and venturi orifice are constructed to provide a laminar flow of the gas-ion mixture through the flow  
15 tube.

12. An instrument for the analysis of volatile organic compounds, said instrument including

a downstream quadrupole mass filter and an upstream quadrupole mass filter  
20 housed within an evacuated chamber,

the interior of said chamber being divided into sections by an electrostatic screen to shield the downstream quadrupole mass filter and the detector from the upstream quadrupole mass filter and source introduction, and

a flow tube comprising a straight tube and two bends connecting the upstream  
25 quadrupole mass filter to the downstream quadrupole mass filter.

13. The instrument as claimed in claim 1 wherein the interior of the chamber is evacuated by a pumping system that will maintain the internal elements within appropriate operating margins.